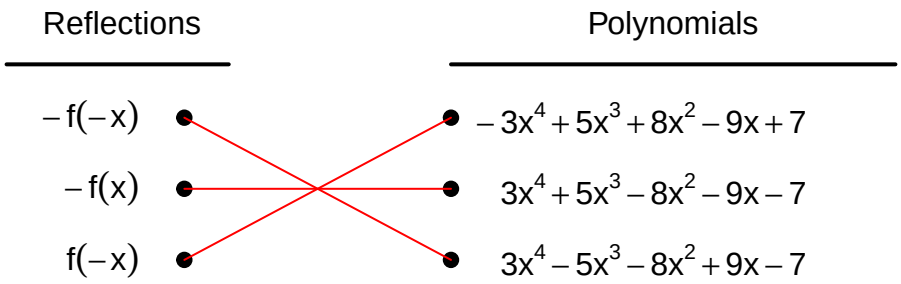
Name: Date:

Exam: Function Reflections (Solution version 3)

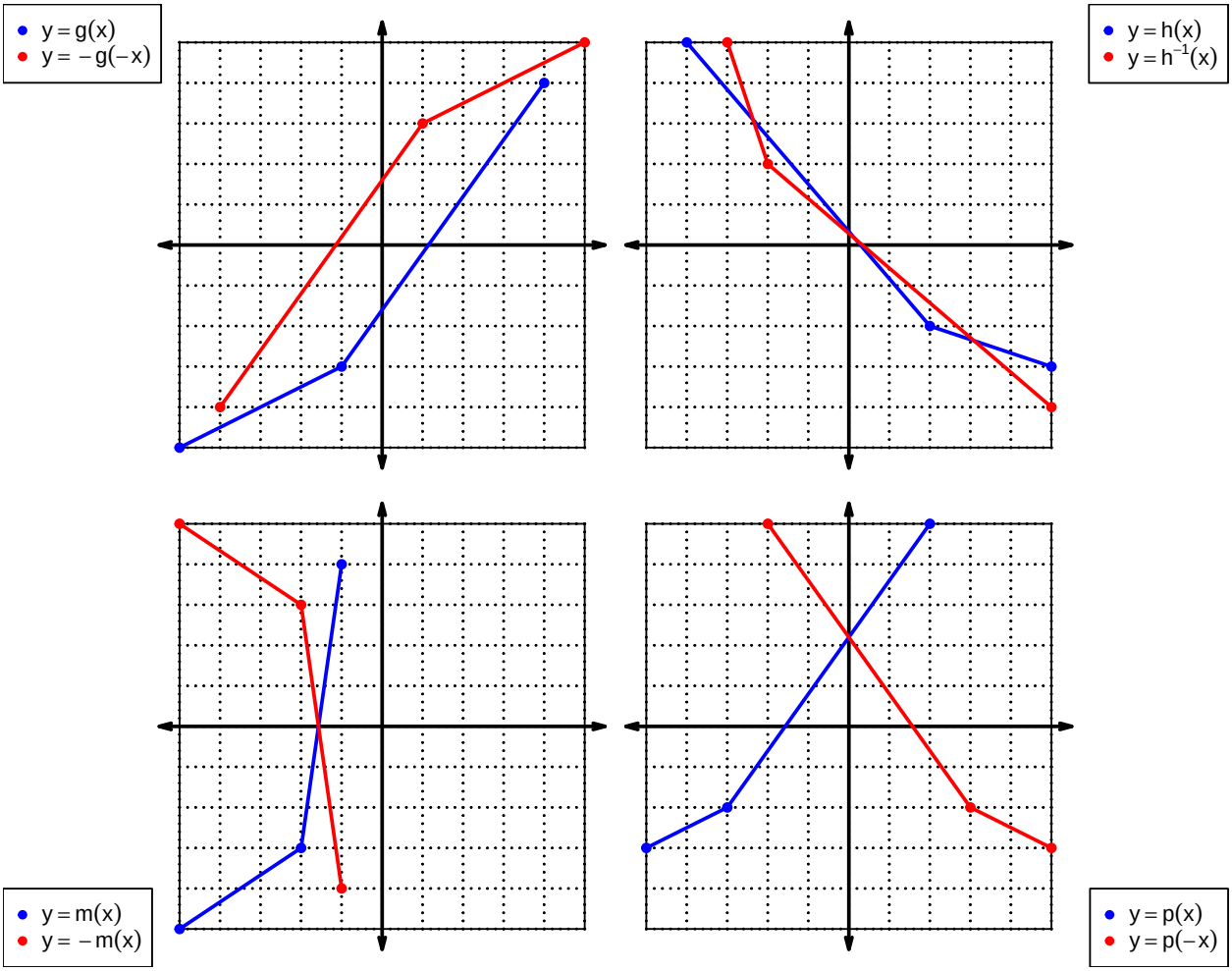
1. Let function f be defined by the polynomial below:

$$f(x) = -3x^4 - 5x^3 + 8x^2 + 9x + 7$$

Draw lines that match each function reflection with its polynomial:



2. In each xy plane shown below, a function is graphed with blue. Draw the indicated reflections (as a second curve, indicated in legend) with black (or with whatever you have). The x axis is horizontal and the y axis is vertical (as typical), and the scale is equal on both axes.



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For all questions on this page, the functions f, g, and h are defined by the table below.

x	$f(x)$	$g(x)$	$h(x)$
1	2	6	3
2	7	3	4
3	8	4	5
4	1	7	7
5	4	1	9
6	6	8	8
7	9	5	1
8	5	9	2
9	3	2	6

3. Evaluate $h(7)$.

$$h(7) = 1$$

4. Evaluate $f^{-1}(8)$.

$$f^{-1}(8) = 3$$

5. Assuming g is an **odd** function, evaluate $g(-5)$.

If function g is odd, then

$$g(-5) = -1$$

6. Assuming h is an **even** function, evaluate $h(-6)$.

If function h is even, then

$$h(-6) = 8$$

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7. A function, f, is **even** if $f(x) = f(-x)$ for all x in the domain. A function, g, is **odd** if $g(x) = -g(-x)$ for all x in the domain.
   Let polynomial p be defined with the following equation:

$$p(x) = -x^2 - 1$$

   a. Express $p(-x)$ as a polynomial in standard form.

$$p(-x) = -(-x)^2 - 1$$
$$p(-x) = -x^2 - 1$$

   b. Express $-p(-x)$ as a polynomial in standard form.

$$-p(-x) = -\left(-x^2 - 1\right)$$
$$-p(-x) = x^2 + 1$$

   c. Is polynomial p even, odd, or neither?

   even

   d. Explain how you know the answer to part c.

   We see that $p(x) = p(-x)$ for all x because $p(x)$ and $p(-x)$ are equivalent polynomials. Thus function p satisfies the criterion for being an even function.

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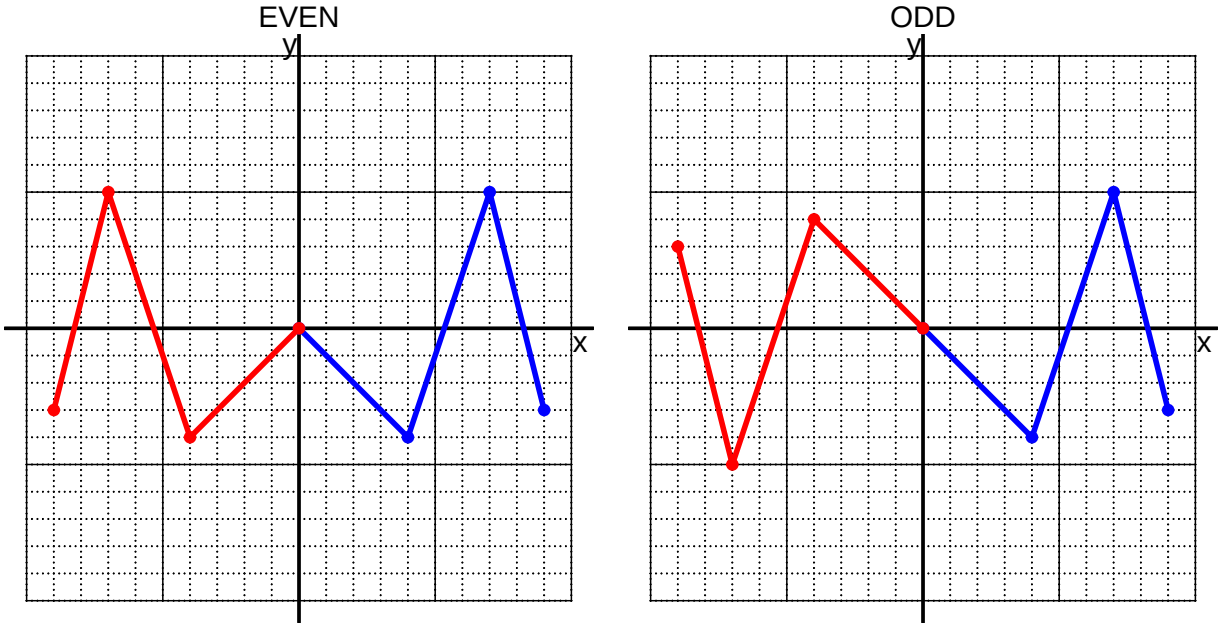
8. I have drawn half of a function. Draw the other half to make it even or odd.



9. Let function f be defined with the equation below.

$$f(x) = \frac{x}{9} + 4$$

a. Evaluate $f(99)$.

step 1: divide by 9
step 2: add 4

$$f(99) = \frac{(99)}{9} + 4$$
$$f(99) = 15$$

b. Evaluate $f^{-1}(7)$.

step 1: subtract 4
step 2: multiply by 9

$$f^{-1}(x) = 9(x - 4)$$
$$f^{-1}(7) = 9((7) - 4)$$
$$f^{-1}(7) = 27$$

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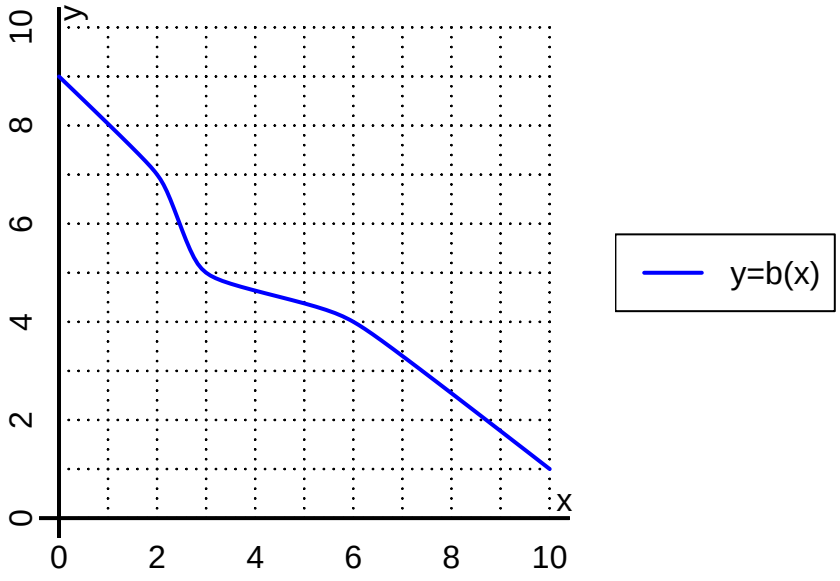
10. The function b is represented by the curve $y = b(x)$ graphed below.



a. Evaluate $b(2)$.

$b(2) = 7$

b. Evaluate $b^{-1}(5)$.

$b^{-1}(5) = 3$

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11. Function f is defined by the table below.

    a. Complete the columns for $-f(x)$ and $f(-x)$ and $-f(-x)$.

x	$f(x)$	$-f(x)$	$f(-x)$	$-f(-x)$
-2	-5	5	5	-5
-1	7	-7	-7	7
0	0	0	0	0
1	-7	7	7	-7
2	5	-5	-5	5

b. Is function f even, odd, or neither?

odd

c. How do you know the answer to part b?

Function f is odd because column $-f(-x)$ matches column $f(x)$ exactly.